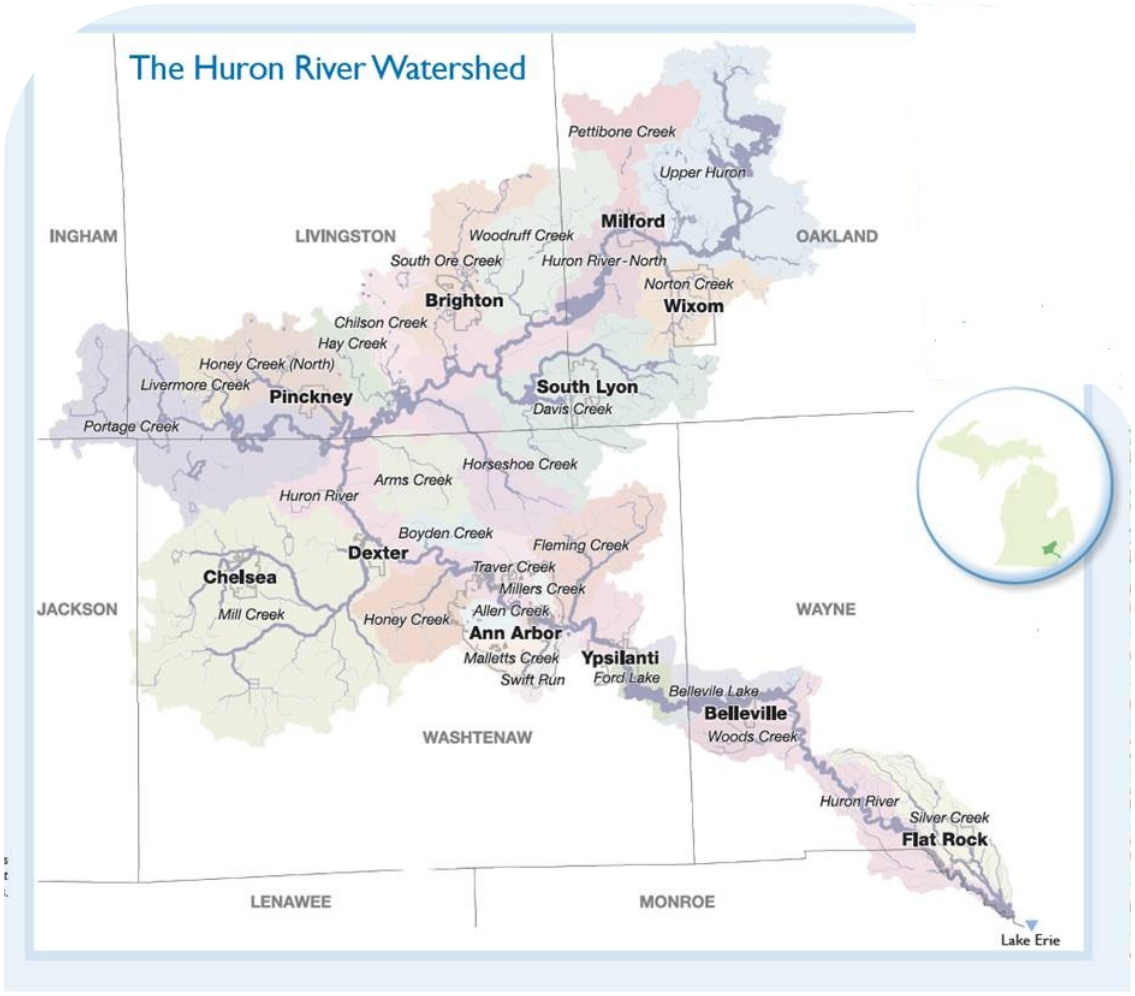
Creating Climate Resilient Communities

Through a Watershed Approach

A "**climate-resilient community**" reduces its vulnerabilities and risks associated with projected climate change impacts.

Rebecca Esselman
Huron River Watershed Council

The Huron River Watershed



900 square miles

½ million residents

63 municipalities

Huron River Watershed Council

Formed in 1965 as council of governments

The Approach

- Goal: pilot a process to address local climate change impacts by convening interested stakeholders to determine information needs and strategies that build resiliency to climate change in the watershed

- Process:
  - Plenary to initiate
  - 3 sector groups – natural infrastructure, instream flows, water infrastructure
  - 18 peer group meetings (3 groups, 6 monthly meetings)
  - Sector groups identify greatest need for members of their sector
  - Climate scientist in the room to help fill information gaps and translate the science
  - 3 reports
  - Plenary to share outcomes

Sector-based Workgroups

WATER INFRASTRUCTURE

for practitioners involved with water utilities, wastewater treatment facilities, stormwater management

IN-STREAM FLOWS

for dam operators, fisheries biologists, and hydrologists

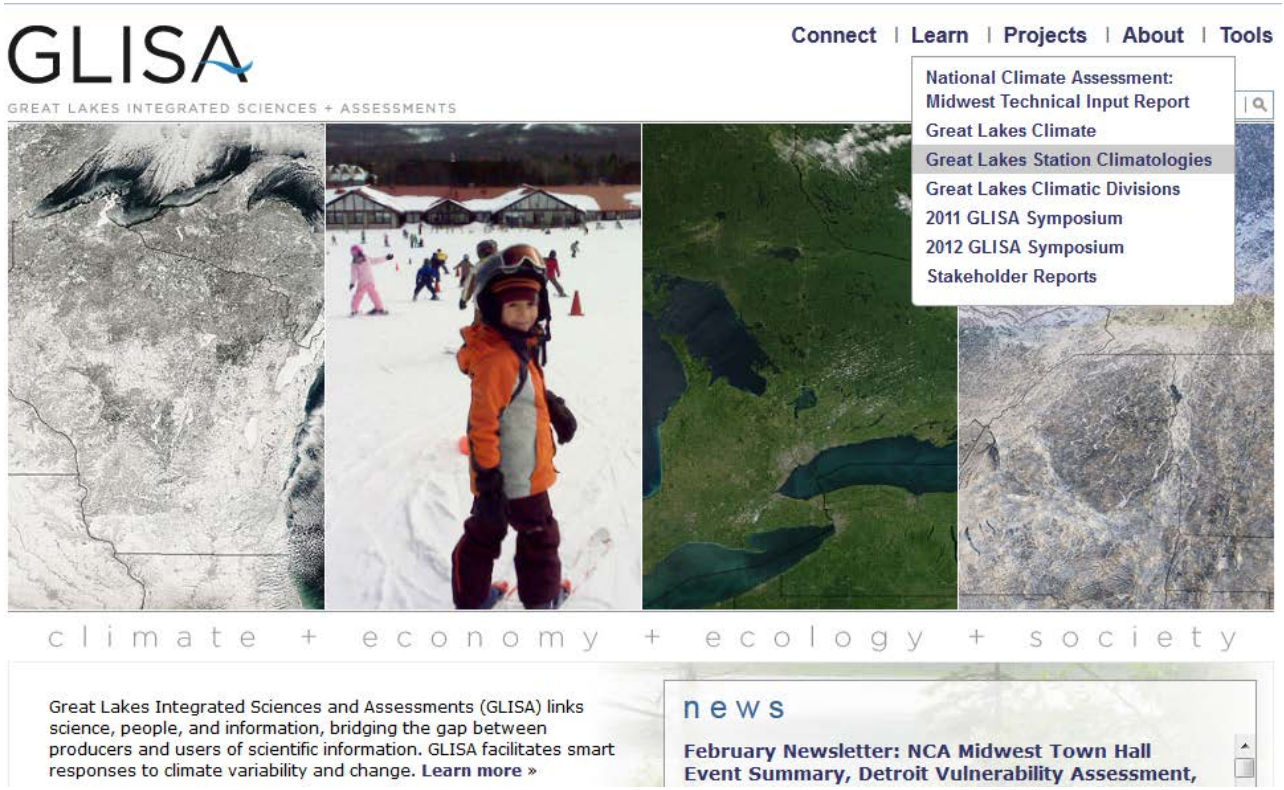
NATURAL INFRASTRUCTURE

for land managers involved with natural areas preservation, restoration, and management

The Climate Science

GLISA

- Ann Arbor Climatology
- Southeastern Michigan Climatology
- Midwest Technical Reports



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Natural Infrastructure Group Recommendations

1. Research how climate change is expected to impact key tree species in the watershed
2. Summarize findings in fact sheets and disseminate to key audiences

Climate Resilient Communities

Huron River Watershed Council

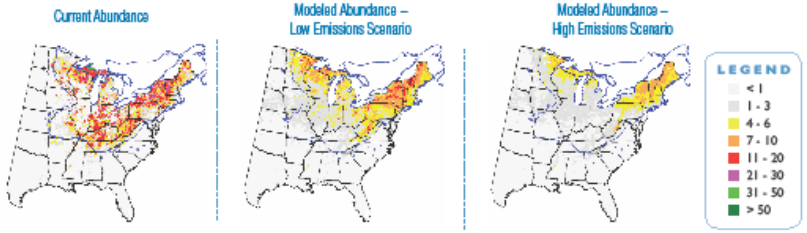
Trees of the Huron River Watershed in a Changing Climate

Sugar Maple *Acer saccharum*

Description

Sugar maple is found throughout the central Midwest states with its highest abundance in the north. It is a highly shade tolerant, long-lived, slow growing species that is found more in cool climates on rich, moist, well-drained sites. This species does best on highly fertile soils and can form almost pure stands. It is a keystone species of the mesic southern forest and therefore very important ecologically. It is also very economically valuable for timber and maple syrup production in the upper Midwest, New England and Canada.

Change Maps for Sugar Maple[1]



Abundance change maps for sugar maple showing current (1961-1990) range and importance of the species and predicted future (2071-2100) range and importance using an average of three low emissions climate models. The Importance Value ranges from 0 to 100 and gives a measure of the abundance of the species.

Implications of Climate Change

Declines in this species have already been noted. Climate models show a dramatic and nearly complete loss of this species throughout the south-central Midwest including Michigan except it its northernmost latitudes. Under most scenarios, sugar maple will be far less abundant in the Huron River watershed. Given that both sugar maple and American beech are likely to decline in the area, the composition of mesic southern forest should be considered at risk and monitored for these and other changes. For planting and restoration purposes, red maple may be the best alternative.

Natural Communities Associations[2]

Canopy dominant in mesic southern forest. Canopy associate in floodplain forests (above influence of floodwaters), southern hardwood swamp, and wet mesic flatwoods.

Vulnerability of Natural Communities[3]

Mesic southern forests, in which sugar maple are a dominant canopy species, are likely to expand in range northward. However, the sensitivity of sugar maple indicates that this species will not do well in lower Michigan and may only be a significant part of this community in its northernmost latitudes. Under drier, warmer conditions southern hardwood swamps and wet mesic flatwoods will be negatively impacted as local hydrology is altered.

[1] Prasad, A. M., L. R. Iverson, S. Matthews., M. Peters. 2007-ongoing. A Climate Change Atlas for 134 Forest Tree Species of the Eastern United States [database]. http://www.nrs.fs.fed.us/atlas/tree, Northern Research.

[2] Michigan Natural Features Inventory. www.mnfi.anr.msu.edu/communities

[3] Lee, Y., M. A. Kost, J. G. Cohen, and E. H. Schools. 2012. Climate Change Vulnerability Assessment and Adaptation Strategies for Natural Communities in Michigan, Focusing on the Coastal Zone. Michigan Natural Features Inventory Report No. 2012-18, Lansing, MI.

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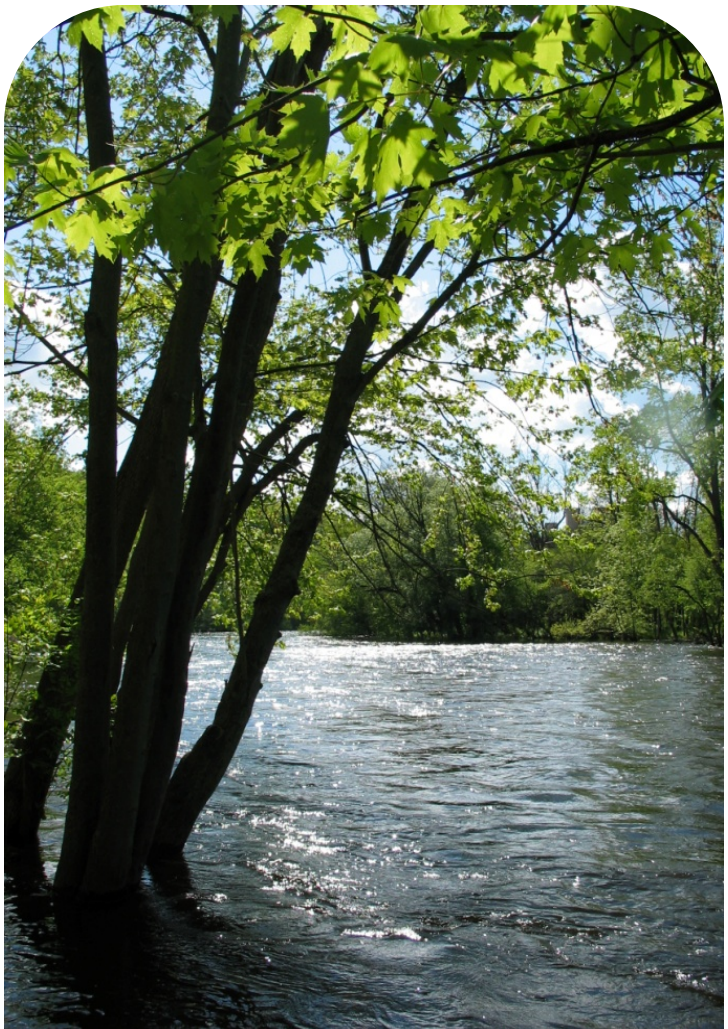
Favorability of future climate to tree species of the Huron	
Boxelder	+
Red Maple	0
Sugar Maple	–
Paper Birch	–
Hickory spp.	+
American Beech	–
Tamarack	–
Black Spruce	–
Eastern White Pine	–
White Oak	+
Bur Oak	+
Black Oak	+
American Basswood	0

Tree Species Fact Sheet describing expected changes in range and abundance of a species, and the vulnerabilities of the natural communities in which they occur.

Water Infrastructure Group Recommendations



1) Improve accuracy of rainfall frequency curves adopted by the State and local governments, which are used as the basis of stormwater-related decisions; and

2) Identify a series of high priority "no-regrets" actions to improve the practice of stormwater management in the watershed.

Precipitation Frequency Data

Current Storm Thresholds or Frequency Intervals do not take in to account

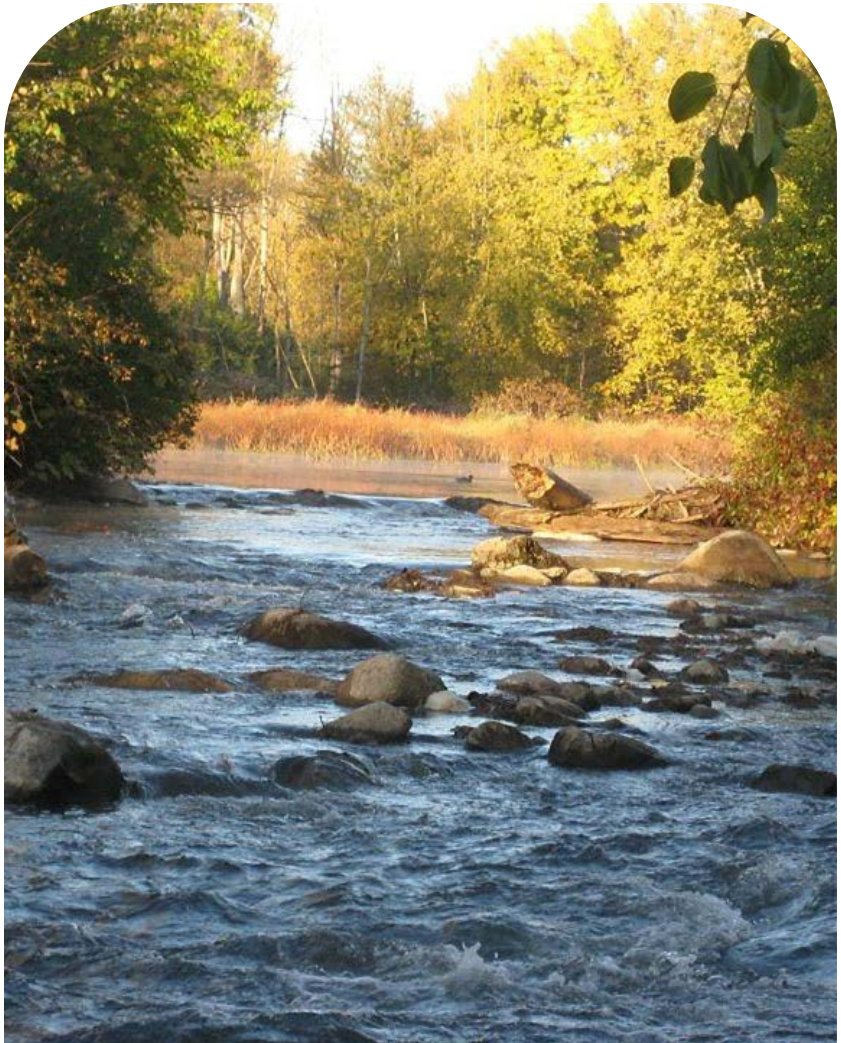
- the last 30 years of records
- any future predictions

And are generalized such that they underestimate storm-size in the Huron by about 13%

Priority No-regrets Actions

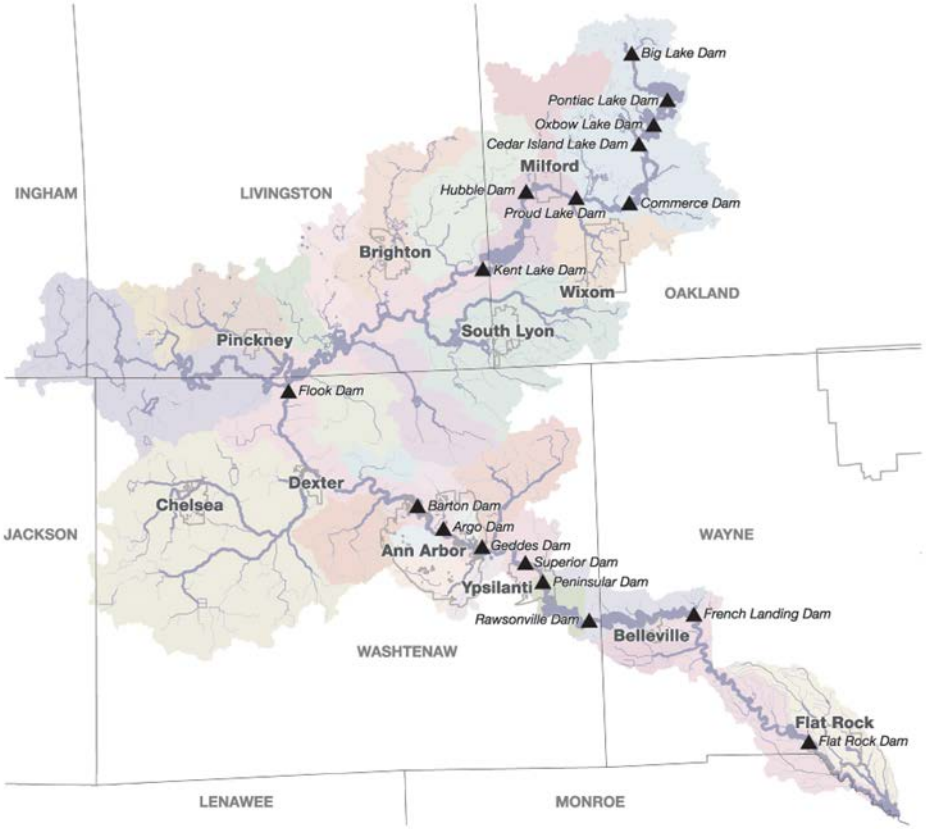
- Green Infrastructure and design standards
- Community planning and regional collaborations
- Education on flooding and mitigation
- Acquire and manage ecosystems to regulate runoff
- Monitor weather and surface water conditions

In-stream Flows Group Recommendations



1. Network dam operators to facilitate improved management, learning and information exchange
2. Establish additional stream gages more comprehensive flow data

Huron River Dams Network



- November 2012 a meeting was convened for dam owners/operators on the mainstem.
- Established the HRWC as the network coordinator
- Agreement to meet once a year
- Create a network platform to share information and plans
- Group is supportive of additional gaging sites

Elements of success

- Relationship with GLISA
- Sector-based approach
- Cross-jurisdictional facilitator
- Watershed approach relevant for water resource issues

Water is a shared resource. Climate Change is a shared threat.

Successes and Challenges

- Practical strategies or information needs identified
- Several strategies already being implemented
- Making time for climate adaption
- Maintaining energy of participants
- Engaging unlikely communities
- 63 municipality landscape make broad adoption complex

Acknowledgements

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Reports can be found online at http://www.hrwc.org/the-watershed/threats/climate-change/

Rebecca Esselman, Watershed Planner, HRWC. resselman@hrwc.org

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